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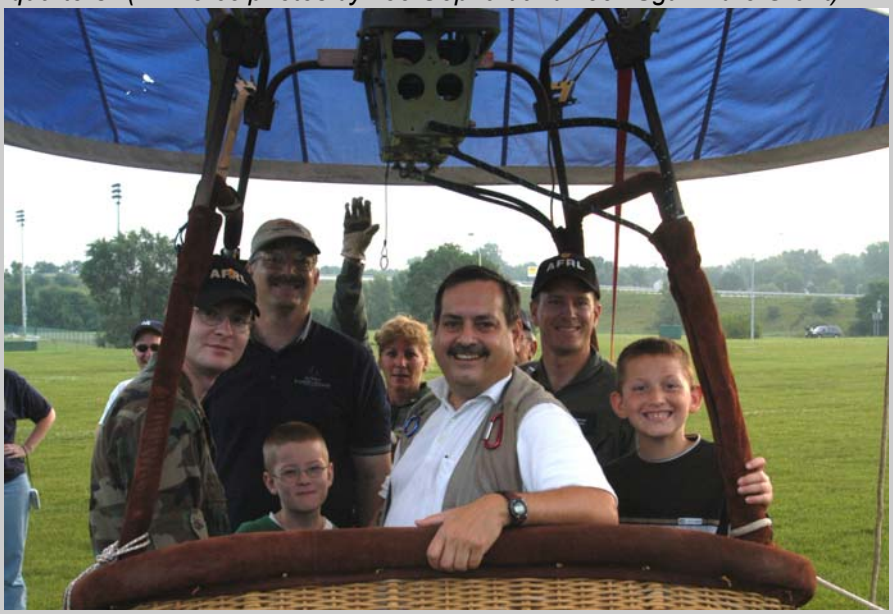
WRIGHT-PATTERSON AIR FORCE BASE, Ohio - Approximately 70 hot-air balloons launched from the lawn of the U.S. Air Force Museum on July 6 in front of a crowd of 15,000 people. The RE/MAX Balloon Celebration was part of the Inventing Flight festivities in honor of the 100th anniversary of powered flight. Below - Among those lucky enough to catch a ride from the AFRL balloon Maj. Allan Hahn, balloon pilot, Space Vehicles Directorate, 2nd Lt. Jason A. Wiggins and son, Jason - Human Effectiveness Directorate, Stephen Scherr and son, Marty - AFRL Headquarters, and Lee Gephart - AFRL Headquarters. (Air Force photos by Lee Gephart and Tech Sgt. Andre Grant)



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http://extra.afrl.af.mil/news/index.htm

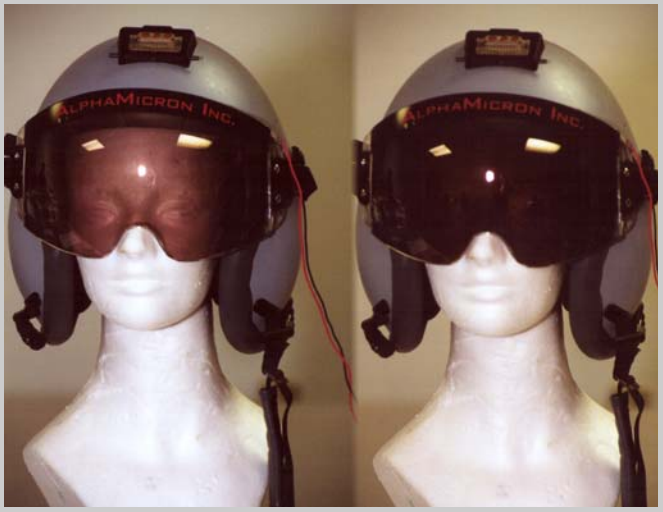
HE helmet visor offers clear improvement

by Dr. David L. Post, AFRL/HECV

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — A Phase II Small Business Innovative Research (SBIR) project within the Human Effectiveness Directorate produced a visor for flight helmets that varies its tint electronically. This unprecedented capability will allow pilots to optimize their vision and enhance the visibility of helmet-mounted displays (HMDs).

A collaboration between the Visual Display Systems Branch and AlphaMicron, Inc., Kent, Ohio, developed a visor for the flight helmet that varies its tint from 15-65 percent simply by turning a knob. The visor can also adjust itself automatically as lighting conditions change and runs for many hours off of a small battery. The original purpose was to increase the contrast of HMD images under bright daytime viewing conditions, but the visor is useful also as a standalone alternative to conventional, fixed-tint visors. Commercial applications of the technology include sunglasses, ski goggles and visors for motorcycle helmets.

The visor uses a thin layer of liquid crystals to control the orientation of dichroic dye molecules. This design provides fast switching speed, high optical quality, a wide array of available tints, and allows the visor to revert to its lightest-tint state if power is lost. @



Electronic flight helmet visor

Coming next month

AFRL awards nearly $1.3 million to universities

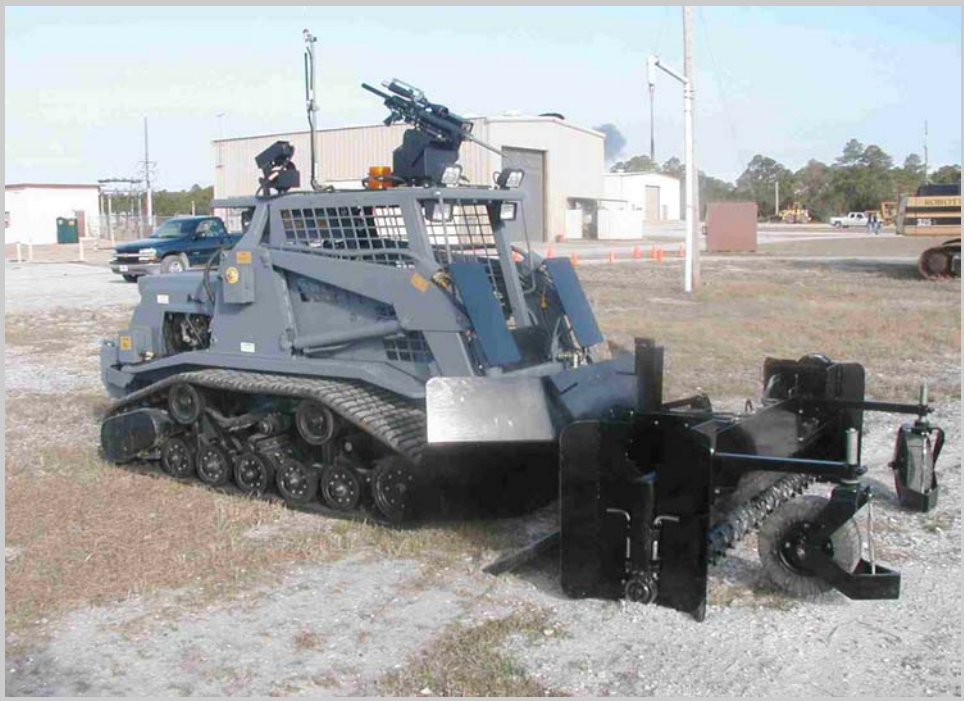
AFRL develops more efficient Environmental Control Unit for deployable tents

Airborne Engineer ARTS passes airlift, airdrop testing

by Timothy R. Anderl, Materials and Manufacturing Directorate

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — Researchers from Air Force Research Laboratory recently completed airlift and airdrop certification for Airborne Engineer All-Purpose Remote Transport System, a low-cost, survivable platform capable of tele-operations in a variety of explosive ordnance disposal, active range clearance, and debris clearing activities.

The technology, which was rapidly prototyped and developed by AFRL's Materials and Manufacturing Directorate to meet Air Combat Command requirements, was successfully dropped three times from a C-130 aircraft at an altitude of 1,500 feet during testing at Pope Air Force Base, N.C.



The AE-ARTS, equipped with a Harley Box Rake for small area ordnance clearance begins explosive ordnance disposal activities. (Air Force photo)

Before these evaluations, prototype AE-ARTS were developed and deployed during Operation Iraqi Freedom in response to a need for tools to protect civil engineering and explosive ordnance disposal members from hazardous force protection and active range clearance activities.

"The purpose of AE-ARTS is to provide civil engineers with a robust suite of tools with which they can accomplish critical Air Force mission goals and reduce the risk to warfighters responding to real-world situations," said Walter M. Waltz, AFRL's airbase technologies division robotics research group leader.

The first two AE-ARTS systems were prepared for deployment and airlifted from Hurlburt Field, Fla. and Charleston AFB, S.C. AFRL engineers are producing two additional units so they can provide a unit to each of ACC's four airborne engineer teams.

EOD robotics, specifically ARTS, were being used extensively in the Southwest Asia area of responsibility to augment EOD members so they could easily, safely and effectively clear unexploded ordnance and other debris from training ranges, air fields and threat areas.

When contingency operations began in support of Operation Iraqi Freedom, civil engineering EOD teams at Ali Al Salem and Al Jaber, Kuwait were faced with increased support mission operations. @

VA Directorate, SPO collaborate on B-2 maintenance

by Philip Ghearing, Air Vehicles Directorate

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — Engineers from the Air Force Research Laboratory's Air Vehicles Directorate, Structures Division successfully completed phase I support for the B-2 SPO's aft deck maintenance program. This program originated after cracks were discovered in B-2 aft decks causing operational and mission capability concerns.

The B-2 system program office, familiar with VA's proficiency with extreme thermal and acoustic environments, contacted the directorate for assistance with their project. A team of VA engineers were fielded together with Northrop Grumman and the B-2 SPO, and worked to develop an aft deck repair concept that would meet the needs of Air Combat Command.

Designing a repair concept was complicated by several factors, such as the questionable cause of the cracking, severe operational environment, low observable signature concerns, and difficulties in dealing with the deck material. AFRL/VAS, working with Northrup Grumman, was tasked to design a contingency repair that could overcome these complications and keep the fleet flying until a more permanent solution was found, and to do so within a five-month timeframe.

After a few months of work, the team found an interim solution to the cracking problem by attaching a metal plate to an internal moldline in the cracked regions. The plate is rigid enough to provide a proper patch, yet flexible enough to allow for the natural tendency of the deck to buckle and not cause the cracks to migrate elsewhere.

The next maintenance phase involves determining the cause of the cracking problem and possible redesign of the B-2 body. The Structures Division is already involved in these efforts, which are scheduled for completion in August 2004. @

Eagle Eyes program helps target potential terrorism

by Fran Crumb, Information Directorate

ROME, N.Y. — Only you know who or what belongs, or doesn't belong in your building, neighborhood or place of employment. Recognition of this fact is behind one of the latest Air Force antiterrorism initiatives, a program known as 'Eagle Eyes.' The program has characteristics of a typical neighborhood-watch program, and Air Force officials consider it to be a key piece in the service's antiterrorism strategy. It relies on accumulated experiences of British and Israeli authorities, which have significant experience in dealing with urban terrorism, according to Special Agents Lynn Stedge and Paul Swiencicki of Air Force Office of Special Investigations (OSI) Detachment 102D at the AFRL Rome Research Site.

"They make it their business to pay attention to small things that, in combination, can indicate terrorist targeting," Stedge said. "'Eagle Eyes' is our model for doing just that. The simple act of recognizing suspicious behavior and reporting activity to law enforcement authorities could thwart terrorist acts and save lives."

At the Rome Research Site, anyone with something to report should immediately call the RRS Security Forces Desk Sergeant at 330-2961 or 330-2200, or the Rome Police Department. From there, security forces and/or local law enforcement will respond as appropriate to the immediate situation and pass the report to the OSI. From there, OSI will begin appropriate follow-up action, which may include an agent responding to talk with the person who called in the report. This is an effort to gain additional information on what was seen or heard. "At the same time, the information will be quickly upchannelled to local, state and federal agencies," Stedge said. "OSI's analytical centers will compare with other Air Force, Army, Navy and other federal agency reports. It all begins at the local level where terrorists conduct operational planning activities." "Every terrorist operation is preceded by precursor events, which people need to recognize and report. Terrorist acts don't just happen - they are carefully planned and rehearsed many, many times in advance," said Swiencicki said. "Studies have shown, most (upwards of 88 percent) of terrorist actions that reach the attack stage, are successful."

"During an attack, you may have seconds to react and respond to the life or death situation. The odds are stacked against you. But, pre-attack activities can take weeks, months and even years to accomplish. Reports from the populous are the major sources of indicators, by which law enforcement and/or the intelligence community can identify and prevent potential attacks."

The key is public awareness of what to look for both on and off military installations and the 'Eagle Eyes' program is something in which the whole community needs to be involved. "Anyone from active-duty military members, to family members, to government civilians, contractors, off-base business proprietors, and the local community could see something out of the ordinary, report it, and make the difference between a terrorist act occurring or not occurring," Stedge said. "Our best chance to detect and prevent a terrorist act in our community is to remain vigilant and report suspicious activity. The more eyes and ears we can enlist to be on the lookout for suspicious activity, the more difficult we can make it for terrorists to act."

"No one should be hesitant about reporting incidents that could turn out to be innocent behavior," he said. "That's bound to happen from time to time, but you don't know if it's innocent until you report it and have it checked out. When lives are at stake, it's better to be safe than sorry. If in doubt, report it. Your call could make the difference. The bottom line is if something bothers you or doesn't seem right, tell someone." @

AFRL Rome transitions intelligent agents software

by Fran Crumb, Information Directorate

ROME, N.Y. — Final demonstrations of Autonomous Negotiating Teams (ANTs) software were conducted June 3 in Arlington, Va. The Air Force Research Laboratory is the lead technical agent for the Defense Advanced Research Project Agency (DARPA) ANTs program. The demonstration highlighted improved warfighter capabilities in the areas of flight and maintenance scheduling.

Intelligent software agents are the core technology used by the scheduling components. Negotiation techniques allow the agents to coordinate between the operations and maintenance systems for optimized solutions. Software agents have their own internal problem-solving abilities, which allow them to continuously collect specific information and determine when new information must be obtained to remain current in support of decision-makers. Agent technology has the potential to assist users with informational changes and uncertainty associated with strategy and tactic for battlefield command and control, as well as peacetime crisis management situations.

The objective of the ANTs program is to provide technology that enables the development of information systems that autonomously negotiate the allocation of resources to tasks in real-time, distributed systems.

"ANTs scheduling tools were used by several squadrons of Harrier AV-8Bs during Operation Iraqi Freedom," said Daniel E. Daskiewich, program manager in the directorate's Information Technology Division. "The tools provided a 30 percent increase in aircraft availability over similar squadrons that did not have the tool."

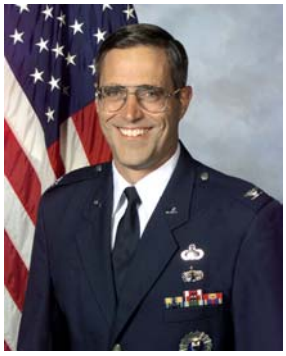
A Technology Transfer Agreement (TTA) has been signed to provide the ANTs scheduling software to the Joint Strike Fighter program - through the prime contractor, Lockheed Martin.

The Navy is funding the ANTs contractors to expand the tools to additional aircraft types, through their Future Naval Capabilities program. The scheduling tools are currently in use at Marine Air Group (MAG) 13, and will potentially be fielded for the entire Marine Corp, pending Marine Air Board approval. MAG-41 is scheduled to receive the tools next.

ANTs scheduling algorithms are being used within the AFRL Integrated Flight Management ATD on Air Mobility Command scheduling problems. The technology is also being integrated with the AFRL Human Effectiveness Directorate's Logistics Control and Information Support (LOCIS) ATD, where an initial prototype will solve C-130 maintenance scheduling problems at Air Force Special Operations Command (AFSOC). @

Vice commander returns to academy in professor role

by 2nd Lt. J. Elaine Hunnicutt, Air Force Research Laboratory Public Affairs



Col. Michael DeLorenzo

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — Col. Michael DeLorenzo, Air Force Research Laboratory vice commander, gave up quizzing the headquarters staff on astronautics for teaching cadets at the U.S. Air Force Academy, Colo., earlier this month.

DeLorenzo will return to the academy after two years at AFRL to teach astronautical engineering. He served at the academy from 1995 to 2001 and was previously a permanent professor and head of the Department of Astronautics.

This was not the Knoxville, Tenn., native's first time in the laboratory, and he noted that a lot has changed. He served at Eglin Air Force Base, Fla., from 1991 to 1995 as the Wright Laboratory Armament Directorate Munitions Division Advanced Guidance Division chief and acting chief scientist.

He leaves AFRL with fond memories in his heart. "I will miss the people most. I will miss their smiles, enthusiasm and professionalism. They know what they are doing is important, and you can see it when you talk to them," DeLorenzo said.

When it comes to the people at AFRL, he reminds them not to worry about career paths and promotion. "Maintain a positive can-do attitude, and take any situation you are in and make it better. Every job is promotable, as long as you do your best."

"We have an important mission. Win wars quickly and with minimal loss of lives." According to DeLorenzo, the people in AFRL are dedicated professionals who are committed to supporting the warfighter and that mission.

As he looks back on his time at AFRL, he recalls Sept. 11, 2001, as the most memorable and defining moment. He said it changed the way our nation and AFRL will do business forever.

"It changed our focus; our mainland was attacked for the first time since 1812, and this gave us a new sense of urgency to field technologies that can protect us," DeLorenzo said.

He feels his biggest contribution to the organization was to listen to the people.

When asked about his personal motto he said, "Our people have good ideas; I tried to listen and support them to make their great ideas a reality. It can be summed up in the Bible in Romans 12:1-2."

DeLorenzo was commissioned and graduated from the academy as a distinguished graduate with a bachelor's degree in astronautical engineering and engineering sciences in 1974.

He holds a master's degree in electrical engineering from New Mexico State University, Las Cruces, N.M. and a doctorate in philosophy in control systems from Purdue University, West Lafayette, Ind. @

ML Directorate research may lead to multi-purpose grease

by Timothy R. Anderl, Materials and Manufacturing Directorate

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — When Air Force researchers were recently asked by representatives at Ogden Air Force Base, Utah, to analyze wear and rusting challenges plaguing the C-5 Galaxy aircraft, they determined that a unique grease they'd developed to solve a problem in cruise missile bearings may provide a solution.

Collaborative research, spearheaded by Air Force Research Laboratory Materials and Manufacturing's Directorate, led to the discovery of MIL-PRF-32014 military qualifying grease, a reliable, low-cost replacement grease for use in cruise missiles.

Researchers predict that the lubricant will generate savings for the Air Force by eliminating costs associated from C-5 maintenance that may be the result of corrosion, rust and wear.

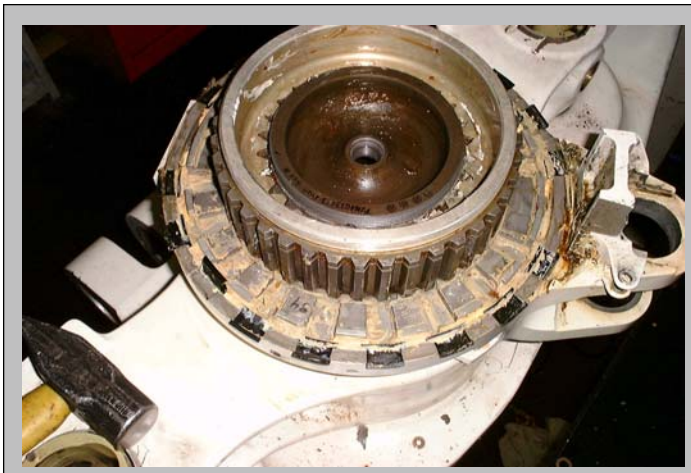
In the late 1980s, researchers from the directorate's nonstructural materials branch began working with various grease companies to find a commercial source of grease to replace a mineral oil sodium soap thickened product used in cruise missiles.

While in storage, the mineral oil product reacted with air moisture and bled out of bearings.

Due to the high cost to overhaul the missiles and re-grease bearings, researchers sought grease that could be stored in adverse conditions. The grease also had to meet extreme operational requirements.

The C-5 landing gear assembly contains wheel bearings and other parts, which are exposed to moisture and rain, air, bacterial decontaminants and other phenomena that encourage corrosion.

These parts are coated in grease and lubricated regularly to make them more effective, however changes in the chemical or physical properties of the grease that coats these unique systems also occur under these environmental conditions.



The main landing gear strut from the C-5 landing gear assembly is coated in grease. This strut also shows signs of corrosion and wear.

"Though AMOCO had discontinued their lubricants branch, Nye Lubricants, a small business that specializes in specialty lubes, had commercialized a MIL-PRF-32014 qualifying grease called Rheolube 374A," said Ed Snyder, a researcher in the directorate.

Long term testing of the Rheolube 374A grease is currently being conducted, though the success of the grease has already been validated by several military and commercial agencies.

ML researchers have conducted sophisticated high-humidity and high-speed testing of the grease over long periods of time and in adverse conditions. @

Net Index

Due to the number of submissions we receive, some sections of *news@afrl* are available exclusively on-line. The on-line version of the newsletter allows users to view the AFRL corporate calendar, news releases generated by AFRL headquarters, operating instructions, L@b L@urels and Roundups sections.

The L@b L@urels section of the electronic newsletter is dedicated to members of Air Force Research Laboratory who receive awards and honors. The Roundups section of the electronic newsletter keeps Air Force Research laboratory employees informed about contracts AFRL has awarded. Below is an index of articles one can find in each of these on-line sections.

L@b L@urels

Roundups

To view the full text of these and other articles visit the *news@afrl* page on the Internet at http://extra.afrl.af.mil/news/index.htm.
To submit L@b L@urels or Roundups from your directorate, send a query to AFRL Public Affairs at:

Jill.Bohn@afrl.af.mil

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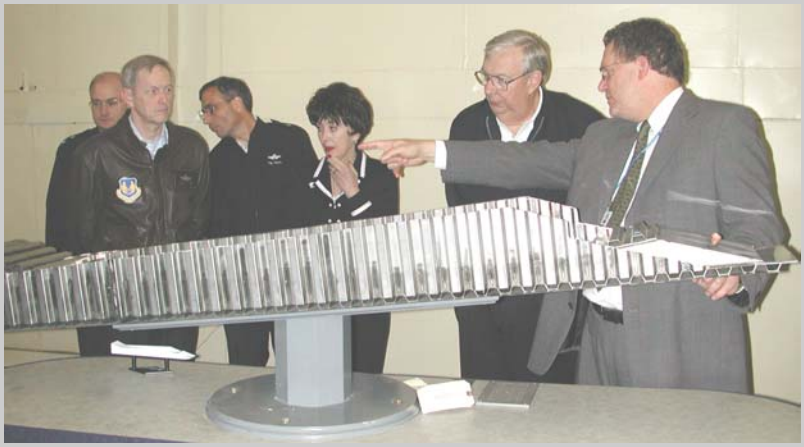
- **AFRL awards $5M contract to Lockheed Martin**
- **ML Directorate recognizes the best of 2002**
- **Rome awards $1.3M contract to Alphatech Inc.**
- **SUNY - Geneseo professor awarded AFRL contract**
- **Rome awards $24.9M contract to small business**

For more on these stories see news@afrl
http://extra.afrl.af.mil/news/index.htm

Roche sees hypersonic technologies during lab visit



WRIGHT-PATTERSON AIR FORCE BASE, Ohio — Dr. Thomas Jackson, deputy for science in the aerospace propulsion division, explains the intricacies of the Air Force-designed supersonic combustion ramjet to Secretary of the Air Force Dr. James D. Roche. Roche toured the Propulsion Directorate's research facility in June and received updates on the advanced hypersonic air breathing engine that could power a vehicle up to speeds of Mach 8. Hypersonic technologies developed in the propulsion lab could enable a wide spectrum of warfighting capabilities from high-speed weapons and aircraft to easy space access. Pictured from left to right — Maj. Gen. Paul D. Nielsen, Commander, Air Force Research Laboratory; Lt. Gen. Charles Coolidge Jr., vice commander, Air Force Materiel Command; Brig. Gen. William Jabour, Aeronautical Systems Center vice commander; and Dr. Jacqueline Henningsen, director of the Air Force Studies and Analysis Agency. (Air Force photo by Michael Kelly)